

REMARKS

The Office Action dated April 26, 2004, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 15 and 23 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. Claims 15-25 presently are pending in the application, and are respectfully submitted for consideration.

As a preliminary matter, the Office Action indicated that claims 19 and 21 contained allowable subject matter, and would be allowable if amended to be in independent form including all the limitations of the base claim and any intervening claims. Applicant wishes to acknowledge with appreciation to the Examiner the finding of allowable subject matter. As will be discussed below, applicant submits that all of claims 15-25 should be found allowable.

Claims 15-18, 20, and 22-25 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent 6,054,894 (Wright et al.) in view of U.S. Patent 5,049,832 (Cavers). The Office Action took the position that Wright disclosed all of the elements of the claimed invention, with the exception of “categorizing the signal samples into classes.” Cavers is cited as curing the deficiencies of Wright and the Office Action took the position that it would have been obvious to one having ordinary skill in the art at the time the invention was made to “modify the Wright system as taught by Cavers.” The Office Action further alleged that the motivation to combine would be “to achieve a

method of linearizing an amplifier to produce an amplified output sample in response to predistorted input sample for desired constant amplitude gain in communications system.” Applicant respectfully submits that the presently pending claims recite subject matter that is neither disclosed nor suggested in the cited references.

Claim 15, upon which claims 16-22 depend, recites a method for defining correction parameters used in transmitter linearization executed by a predistortion method. The method includes taking a plurality of samples from a signal coming out of the transmitter. The method also includes categorizing the plurality of signal samples into classes. The method also includes comparing the plurality of signal samples with corresponding ideal signal values. The method also includes defining a correction parameter for each class on the basis of an average comparison result of all signal samples of the class in question.

Claim 23, upon which claims 24 and 25 depend, recites a transmitter. The transmitter includes sampling means for sampling the signal coming out of the transmitter and configured to take a plurality of samples at a time. The transmitter also includes a predistorter for predistorting the signal to be sent to compensate the nonlinearity of the transmitter. The transmitter also includes categorization means for categorizing into classes said plurality of signal samples taken from the signal coming out of the transmitter. The transmitter also includes comparison means for comparing the plurality of signal samples with the corresponding ideal signal values. The transmitter also includes definition means responsive to the comparison means for defining amplitude,

and preferably phase correction parameters for each class on the basis of an average comparison result of all signal samples of the class in question. The predistorter is arranged to use the correction of parameters then predistorting the signal being transmitted.

As discussed in the specification, the present invention enables an amplified model that is not formed, and predistortion parameters that are not defined, using a gradient search. Thus, the amplified model is formed quickly and without a slow convergence on the basis of a measured signal, such as a transmitter output signal, and a corresponding input signal buffered into memory. The increased speed of the method of the present invention is based on the fact that the nonlinearity of the transmitter is defined directly on the basis of certain sample material in certain classes, such as classes according to transmit power. The present invention enables a faster implementation based on minimizing the error of testing in different classes in which the nonlinearity of the transmitter is determined, wherein the number of tests may be large. It is respectfully submitted that the cited references of Wright and Cavers, when viewed alone or combined, fail to disclose or suggest the elements of any of the presently pending claims. Therefore, the prior art fails to provide the critical and unobvious advantages discussed above.

Wright relates to a digital control of a LINC linear power amplifier. Wright describes a LINC amplifier providing substantial linear amplification in two non-linear amplifiers by decomposing the original signal into two constant amplitude envelopes, and

phase varying signals that are combined to interfere to re-form the original signal. Wright describes taking one sample at a time and determining the correction parameter update of a single sample. Wright describes that this sample is down converted to complex base band by RF down conversion block 26 and analog to digital conversion block 27. The real RF base band signal is translated to a complex base band equivalent signal 137 that is utilized by adaptive control processing and compensation estimator block 28. Estimator block 28 examines these three signals and determines the remaining level of imperfection in the analog up-conversion process that has not been previously corrected. Wright, however, fails to disclose or suggest taking a plurality of samples from a signal coming out of a transmitter, categorizing the plurality of signal samples into classes, and defining a correction parameter for each class on the basis of an average comparison result of all signal samples of the class in question.

Cavers relates to amplified linearization by adaptive predistortion. Cavers describes a solution for linearizing an amplifier based on an iterative type search in which the predistortion parameters slowly converge on a final value, or solution. Cavers describes only one output sample being taken at a time and a look up table entry being adjusted on the basis of the single sample. Thus, Cavers describes using an amplified output sample in response to a predistorted input sample derived from an input modulation sample. Cavers, however, does not disclose or suggest taking a plurality of samples from a signal coming out of the transmitter, categorizing the plurality of signal

samples into classes, and defining a correction parameter for each class on the basis of an average comparison result of all signal samples of the class in question.

In contrast, the present invention discloses “taking a plurality of samples from a signal coming out of said transmitter, categorizing said plurality of signal samples into classes, defining a correction parameter for each class on the basis of an average comparison result of all signal samples of the class in question,” as recited in claim 15. Claim 23 recites identical subject matter. Applicant submits that the cited references do not disclose or suggest at least these features of the pending claims.

As discussed above, Wright and Cavers describe taking one sample at a time to determine any correction parameters. Neither Wright nor Cavers discloses or suggests taking a plurality of samples from a signal and categorizing the plurality of signal samples into classes. Applicant also submits that because Wright and Cavers use one sample, then neither reference discloses or suggests using a plurality of samples defining a correction parameter. Thus, for at least these reasons, Applicant submits that the pending claims, including independent claims 15 and 23, are distinguishable over the teachings of Wright and Cavers. Applicant respectfully requests that the obviousness rejection be withdrawn.

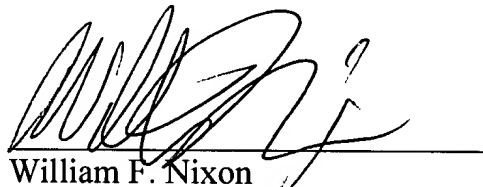
The remaining dependent claims recite subject matter in addition to independent claims 15 and 23, and are distinguishable from Wright and Cavers for at least the same reasons. Thus, it is submitted that claims 15-25 recite subject matter that is neither

disclosed nor suggested in the cited references. It is therefore respectfully requested that all of claims 15-25 be allowed and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'W. F. Nixon', is written over a horizontal line.

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